

**Roanoke College (Fall 2022 – 2023) Department of Mathematics, Computer Science and Physics**

<b>ENGS-191-A</b>	<b>Engineering Foundations</b>	<b>MW 02:50PM-04:20PM</b>	<b>TREX 374</b>
<b>ENGS-191-B</b>	<b>Engineering Foundations</b>	<b>MW 01:10PM-02:40PM</b>	<b>TREX 263</b>

**Instructor: John F. Pescatore Office: Trexler #175 Office Hours: 10:00 - 11:00 T W Th and 2:00 – 4:00 T (also by appointment) Email: pescatore@roanoke.edu**

**ENGS 191 Engineering Foundations**

Introduces the engineering profession, ethics and professional responsibility, teamwork and professional communication. Use of hand calculators and graphing, implementing unit conversions, engineering problem-solving procedures, computing tools (programming for engineering – use of MATLAB, spreadsheets and graphing), technical writing, and definition/identification/modeling of an engineering problem/system. (1) Lecture: 3 hrs./wk.

**Introduction**

This course introduces engineering as a professional endeavor and is designed to develop quantitative and problem-solving skills. Students will be challenged to think critically and apply an organized, systematic approach to achieve solutions to problems. The principles and concepts presented will prepare students for upper-level course in the engineering sciences

**Course description**

Key constructs of the engineering profession will be introduced including, but not limited to, ethical dilemmas, liability pitfalls, development of oral and written communication skills, continuing education, the path to licensure, career advancement & interviews, working on interdisciplinary teams and critical thinking.

Basic engineering calculations, graphing/ plotting and simple statistical analyses will be covered in detail with manual calculations and using MATLAB/Octave and EXCEL. Significant attention will be directed to the importance of dimensions, units, conversion factors and significant digits in engineering calculations. Lastly, principles numerical simulation and identification of various model types will be introduced.

**Learning outcomes**

Upon successful completion of this course, students will be able to:

1. Articulate the basic tenants of professionalism and ethics in the practice of engineering; apply critical thinking skills to form a judgement.
2. Identify and expound on holistic issues that impact engineering solutions including social, global, environmental, economic, and ethical impacts.

3. Communicate results of a study/design/experiment with other team members and an audience by (a) written report through clear, concise technical writing and (b) oral presentation via effective speaking techniques.
4. Write and execute basic code for MATLAB/Octave to perform functions such as matrix operations, plots/ graphs, and curve fitting.
5. Prepare basic EXCEL spreadsheets for statistical analyses and engineering applications.

### Tentative course schedule

The following schedule table is approximate and subject to change except for the test dates. The table, albeit subject to modification, should provide a general picture of the timing for content presentation and assignments.

Teaching week	Dates	Lecture material	Assignment
1	8/29 – 9/02	Technical v. creative writing	Students can expect some type of homework assignment distributed each class
2	9/05 – 9/09	Technical writing (cont'd.) and effective speaking	
3	9/12 – 9/16	Ethics in engineering	
4 (test #1)	9/19 – 9/23	Creative thinking skills	
5	9/26 – 9/30	Building your brand; professional societies; graduate school; continuing education; licensure	
6	10/03 – 10/07	Basic engineering calculation; units, dimensions; review test #1	
7 (test #2) *	10/10 – 10/14	Writing sample; oral presentation	
<b>Fall break</b>			
8	10/24 – 10/28	MATLAB/Octave/EXCEL; review test #2	Students can expect some type of homework assignment distributed each class.
9	10/31 – 11/04	MATLAB/Octave/EXCEL	
10 (test #3)	11/07 – 11/11	MATLAB/Octave/EXCEL	
11	11/14 – 11/18	MATLAB/Octave/EXCEL	
12	11/21 – 11/25	MATLAB/Octave/EXCEL; review of test #3	
13 (test #4)	11/28 – 12/02	Modeling and numerical simulation	
14	12/05 – 12/09	Review of test #4 and semester review	
<b>Final examination week</b>		<b>12/12 – 12/16</b>	

**\*Test #2 – Within the first 2 weeks of class, students will be given an engineering article to critically evaluate. Each student will write a brief technical summary on his/her evaluation of the article, answering questions such as:**

**What was the main point of the article? What important piece of information was the author trying to convey? What was the author's conclusion? Was the subject interesting to you? Did you learn anything?**

**Can you make a sample calculation/ ballpark estimate/ back of the envelope to verify something in the article?**

**Subsequently, each student will give a 3 to 5-minute oral presentation about their evaluation incorporating the written points above.**

### **Attendance policy**

Class attendance is an especially important aspect of a student's success in this course. ***Each student is expected to attend every class and is accountable for missed content and assignments.*** If you have a temperature of 100.4 or higher or other COVID symptoms, do not come to class. Call Health Services IMMEDIATELY. Do not come to class or go to any public area on campus. For your absence to be excused, you must give Health Services permission to notify me that you have consulted them about COVID symptoms. If Health Services informs you that you should isolate and not attend class for multiple days, inform me so that we can plan to keep you current in the course. All absences caused by consultation with Health Services about Coronavirus symptoms or isolation ordered by Health Services will be excused but you will need to do the work and graded assignments even if we extend a deadline for you.

### **Athletic commitments**

College athletes must notify me of any scheduled absences or unavoidable post-injury absences.

### **Masks**

The college is starting the term without a specific mask mandate. Some offices on campus may require that masks be worn (such as Health Services). For this class, masking is optional.

### **Course materials**

- (1) Textbook: There is no specific textbook required. I will provide (a) handouts for each class and digital content on Inquire, (b) non-RC books on reserve at Fintel.
- (2) Calculator: A scientific or graphing calculator is required.
- (3) MATLAB/Octave will be used in the second half of the semester. The instructor will provide instruction on installing Octave on your personal computer.

## Structure and grading

A letter grade will be assigned after final grades are computed for the term as per the scale below. Attendance and class participation will be considered when determining marginal grades.

### Grading scale

A (100-93)	A-(92.9-90)		
B+ (89.9-87)	B (86.9-83)	B- (82.9-80)	
C+ (79.9-77)	C (76.9-73)	C- (72.9-70)	
D+ (69.9-67)	D (66.9-63)	D- (62.9-60)	F (59.9 and down)

The (numerical) final course grade will be determined from the five (5) assessments listed below. Each weighted similarly (20%) for a total of 100%

Assessment	Weighting	Date
Test #1	20%	9/23
Test #2	20%	10/14
Test #3	20%	11/11
Test #4	20%	12/02
Final examination	20%	TBD
Total	100%	

Quantitative type (problem solving) questions will predominate assessments; however, to a lesser extent, there will be some non-computational queries requiring interpretation of graphs/ diagrams from materials testing, identification of certain characteristics of solid bodies or structural members under loading scenarios.

All in-class tests including the final examination are closed book/ notes. The instructor shall provide an equation/formula sheet.

Homework (including required reading) and class notes are absolutely the best sources of review! Tests will not be designed to be cumulative, but as with any course involving physics and math, material from previous tests can be thought of as a prerequisite for future tests. The final examination is cumulative.

### Test make-up policy

Test make-ups are administered in accordance with Roanoke College policy. Anticipated, excused absences must be reported to the instructor with appropriate certification well before the scheduled test date. Legitimate emergency absences must be reported with appropriate documentation within one week of returning to class. No other make-ups will be given.

### **Corrections to grading**

If you think an error may have been made in the grading of your test, carefully review the answer key posted on Inquire and then contact the instructor within 1 week of the test's return with your question. Do NOT alter the original work. The entire test may be re-graded, and the test grade is subject to remain the same, increase or decrease at the discretion of the instructor.

### **Final examination**

The final exam will be comprehensive. As with the tests, it will emphasize both mathematical computations and critical thinking. The best way to review for the final is to review your performance on the four assessments; focus on material that you did not master the first time around and review the topics that you did master.

### **Expected work policy**

This course requires you to spend at least 2 hours of study outside of class for every class hour which is a minimum of 12 hours total work each week inside and outside of class.

### **Electronic devices**

I recommend using only your scientific/engineering calculator during class; students who have their laptop/notebook PC open in class tend to migrate to the internet/ social media during class instruction. I prefer cell phones be left in your backpack and set on silent mode; however, I understand you may need your cell phone active in anticipation of a medical-related call, for example, if you have an immediate family member hospitalized.

### **Inquire policy**

Students are required to be knowledgeable of all postings on Inquire. Each student shall regularly monitor Inquire for course information. Any assignment that requires an Inquire upload will not be accepted in any other form. Uploaded files must be PDF format and readable on the instructor's college computer. Each student must ensure the successful submission of any document and resolve technology problems through the college's IT department.

### **Academic integrity**

I expect all students to follow the rules outlined in Academic Integrity policies of Roanoke College because your learning and integrity are at the core of your RC education.

<http://www.roanoke.edu/academicintegrity> <https://www.roanoke.edu/aihandbook>

In-class assessments will be closed book/notes; therefore, students are not permitted to consult any texts, notes, or other prepared materials during a testing period as such action is a violation under cheating.

All graded work shall be your own work! Questions about how these policies apply to our class should be directed to the instructor. Any violations of AI policies will automatically be turned over to the Academic Integrity Council.

## **Academic integrity (continued)**

All source material must be properly cited using the MLA conventions and use paraphrases or quotations when appropriate. Drafts must include citations. Note that paraphrasing is more than rearranging a few words. I am happy to help, but also encourage you to use the Writing Center at all stages of your paper writing. The instructor will address the need for proper citation and references pertaining to the writing assignment

Online testing – the instructor does not anticipate quizzes or tests administered via Inquire unless there is another coronavirus outbreak or similar pandemic. In the event of going online, the instructor will address policy regarding open book/notes. Any use of outside assistance for online assessments such as web-based apps and Chegg, Course Hero, and r “homework help” sites is not allowed; further, upload of any quiz or test questions to such sites is forbidden.

## **Accommodations**

If you may require an accommodation in this course, please provide me with your documentation within the first 2 weeks of the semester. I must have your documentation at least 48 hours prior to any accommodation made. (Check with the Center for Learning and Teaching for their scheduling guidelines.)

## **Subject Tutoring**

Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4 pm – 9 pm, Sunday – Thursday. We are a Level II Internationally Certified Training Center through the College Reading and Learning Association (CRLA). Subject Tutors are friendly, highly-trained Roanoke College students who offer free, one-on-one tutorials in a variety of general education and major courses such as: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, INQ 250, and Social Sciences (see all available subjects at [www.roanoke.edu/tutoring](http://www.roanoke.edu/tutoring)).

Tutoring sessions are available in 30 or 60-minute appointments. Schedule an appointment at [www.roanoke.edu/tutoring](http://www.roanoke.edu/tutoring), or contact the center at (540) 375-2247 or [subject\\_tutoring@roanoke.edu](mailto:subject_tutoring@roanoke.edu).

## **Writing Center**

The Writing Center at Roanoke College offers tutorials focused on writing projects and oral presentations for students working in any field. Writers and presenters at all levels of experience may consult the Writing Center at any point in their process— including brainstorming, drafting, organizing, editing, or polishing presentation skills—to talk with trained peer tutors in informal, one-on-one sessions. Schedule an appointment at [www.roanoke.edu/writingcenter](http://www.roanoke.edu/writingcenter), where our staff members and workshops are also posted. Questions? Email the center: [writingcenter@roanoke.edu](mailto:writingcenter@roanoke.edu).

## **Accessible Education Services (AES)**

AES is in the Goode-Pasfield Center for Learning and Teaching in Fintel Library ([clt@roanoke.edu](mailto:clt@roanoke.edu))

AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. To schedule an appointment, call (540) 375-2247 or e-mail [aes@roanoke.edu](mailto:aes@roanoke.edu).

If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact the AES at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

### **References Digital**

**MATLAB/Octave and EXCEL references will be uploaded to Inquire throughout the semester**

<https://www.me.psu.edu/cimbala/Learning/General/units.htm>

**On reserve at Fintel Library (from the collection of Dr. J. F. Pescatore)**

**Bly R. W. and G. Blake. Technical writing: Structure, standards, and style. New York. McGraw-Hill, 1982.**

**United States Air Force Academy. Executive Writing Course.**

**Water Pollution Control Federation. Public Information Handbook. Washington, D. C., 1977.**